StorageTek

StorageNet Fibre Channel Switch 4000
WEB TOOLS

User Guide

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About This Document

Introduction

Use this guide for monitoring, configuring, and maintaining a StorageNet Fibre Channel Switch 4000 through WEB TOOLS. You should be knowledgeable about networking in general, routing and bridging in particular. A clearly defined network and security plan is necessary. Your security plan should assess the possible risks to your network and define access policies to deal with those risks.

How This Guide is Organized

This guide is divided into the following chapters:

- Chapter 1, "Product Overview," provides an overview of WEB TOOLS.
- Chapter 2, "Operational Concepts," describes operational concepts.
- Chapter 3, "Using WEB TOOLS," contains general information on using WEB TOOLS.

The following appendix are also included in this guide:

- Appendix A "Glossary."
- Appendix B "Error Messages."

Reference Documents

The following documents contain information related to WEB TOOLS:

Fibre Channel Standards. For detailed information on the Fibre Channel standards, see the Fibre Channel Association web site at http://www.fibrechannel.com.

*StorageNet Fibre Channel Switch 4000 Installation and Reference Guide (*8946119902)

*StorageNet Fibre Channel Switch 4000 ZONING User's Guide (*8946121502)

*StorageNet Fibre Channel Switch 4000 SES User's Guide (*8946121402)

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Before calling StorageTek, please have your information from the Problem Reporting form ready. This form is located at the back of this manual.

If a problem cannot be resolved through Customer Support, a Return Material Authorization (RMA) is issued. Instructions are provided on where to return the part and how to receive a replacement part. If the product is installed by the customer, the customer is responsible for returning the product with freight paid to the nearest repair center.

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Chapter 1 Product Overview

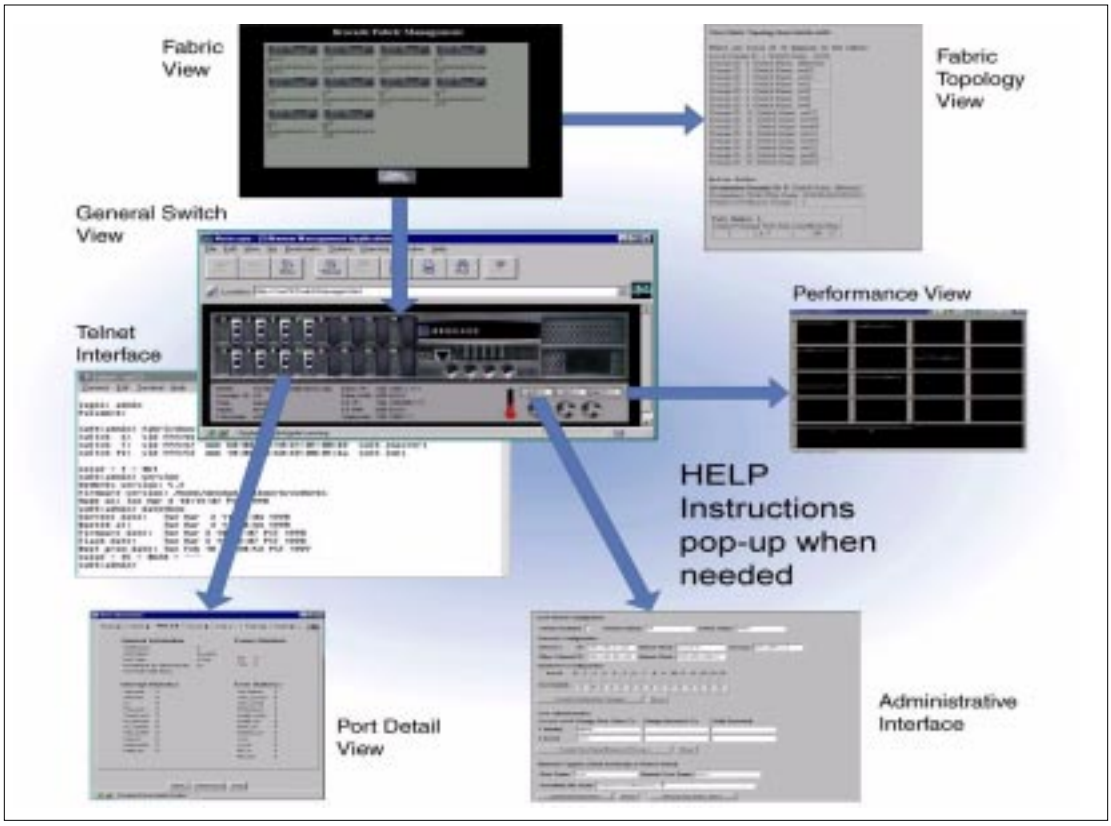
Introduction

This chapter contains general information about managing and monitoring a switch using WEB TOOLS to perform the following:

- Every day management
- Upgrading switch firmware
- Managing switch(es) remotely
- Switch management tools
- Administrative functions

Figure 1-1 shows an overview of the WEB TOOLS screens. You can log onto a switch from a host with a Java enabled web browser through the Internet or Intranet to remotely manage a Server-Storage Area Network (SAN). The SAN is comprised of switches and other SAN devices.

Figure 1-1 WEB TOOLS Overview



WEB TOOLS allow you to dynamically interact with any switch in the SAN to monitor status and performance. Use the available information to make overall topology decisions (for example, increasing a path's bandwidth due to data saturation). Additionally, you can change a switch's configuration or download firmware. The Administrative Interface and Telnet provide the means to make administrative changes and security is enforced by user name and encrypted password.

Every Day Management

You can perform a range of tasks, including the following:

- Monitoring port and switch operations
- Evaluating port, switch, and network performance
- Gathering statistics
- Troubleshooting problems
- Configuring the switch and the network topology

Managing Switch(es) Remotely

You can manage a complex SAN, comprising multiple switches, using WEB TOOLS and a familiar web browser. You have the ability to manage the following:

- Switch identification in network
- Fabric topology/routing information
- Switches/ports general configuration
- Real-time graphical switch/port status and statistics report
  - — Port performance shown graphically (polled up to 2.5 seconds depending on operating system and browser used)
  - — Four minutes of aggregate bandwidth throughput shown graphically, scaled dynamically, based on activity (polled up to 2.5 seconds depending on operating system and browser used).
  - — Management with security protection through:
    - Administrative Interface (GUI)
    - Management by Telnet commands (Telnet session)
- Screen views
  - — Monitoring and gathering information (five screens)
  - — Administrative interfaces (two screens)
- Help functions
  - — Popup help for error conditions
  - — Glossary help
  - — Online help HTML pages

- Interfaces
  - — In-band over a Fibre Channel link
  - — Out-of-band through a 10Base-T Ethernet connection

Switch Management Tools

The management tools provide five screens as described below.

Fabric View Page

The Fabric View page shows the number of network switches and confirms World Wide Names, domain IDs, and switch names, if applicable.

Fabric Topology View Page

The Fabric Topology View page shows the physical configuration including active domains, paths and routing information. For example, this page shows the hop count. Hop count is the number of switches that handle a data frame from origination to the destination.

General Switch View Page

The General Switch View page displays switch enclosure information, confirms general switch information, and includes GUI buttons for quick access to the Administrative Interface, Telnet, and the Performance View pages.

The front panel identifies the type of interface module installed in each switch slot, the industry media (GBIC, or Gigabit Interface Converter) used by the ports, and each port's LED status. From this view, more information is available about the switch by moving to either the Performance View or the Port Detail View pages.

Performance View Page

The Performance View page shows real-time data throughput for each port and switch bandwidth utilization.

Two types of performance data are available. They are: (1) the throughput of each port, and (2) total switch throughput. Bandwidth utilization is critical information needed to make decisions about optimizing performance. An example of a bandwidth utilization decision is if one port begins to handle a disproportionate amount of traffic.

Port Detail View Page

The Port Detail View page shows statistics and general information for all ports, including LED status.

The Port Detail View page displays for whatever port you select in the General Switch View page. Once in this view, every port for that switch can be viewed sequentially by selecting its file folder. Each folder's tab replicates the port's LED status. This allows you to monitor all port status at the same time. Port details include statistics about frames, interrupts, and errors that are helpful when troubleshooting.

Administrative Functions

The administrative functions provide two screens as described below. These screens are for secured interfaces.

Administrative Interface Page

The Administrative Interface page is used to perform routine functions, such as upgrading firmware versions or switch reconfigurations.

Telnet Interface Page

The Telnet Interface page uses a superset of Telnet commands (configuration, diagnostics, displaying, and routing) for switch diagnostics, troubleshooting, and management.

Chapter 2 Operational Concepts

Introduction

This chapter includes WEB TOOLS operational concepts. When using WEB TOOLS, note the following:

- Clickable areas are highlighted with a hint displayed in the left side bottom bar of your browser. This hint displays when you position the mouse over the clickable areas. Examples include switches on the **Fabric View** page, ports and thermometer on the **General Switch View** page. The *admin/telnet/performance* buttons are not highlighted. Glossaries in the switch general information area *are not* highlighted.
- The Response page displays whether each individual configuration change was committed or rejected when making changes in the **admin** page.
- Java is disabled in some versions of Netscape. It must be enabled by checking both *Enable Java* and *Enable Java Script* buttons in the *Preferences/Advanced* menu.
- Netscape or Internet Explorer may hang with Java applications on Windows NT after SP3 due to True Color. To work around this problem, either change the NT display settings to something other than True Color, or download Microsoft's hotfix to modify WIN32K.SYS. The hotfix is available from Microsoft Technical Support.

Logging On to the Switch Through the Web

The WEB TOOLS switch management system runs on the following browsers:

- Internet Explorer 4.0 /Netscape 4.0 or above on Windows NT or Windows 95.
- Netscape 4.0/HotJava 1.1 or above on Solaris 2.5.

To log onto the switch through the Web, perform the following:

❶ Launch a Web browser.

❷ Connect to the switch by entering a URL for the Switchname or Ethernet IP address. For example *http://switchname* or *http://IPAddress*.

Note: You can access the monitoring screens at this point. To access the administration screens continue with Step 3.

❸ To configure the Administrative pages, click the *admin* button. Enter your username and password at the prompt.

Note: Users with user (through Telnet) or admin level privilege can access these pages. The user level is more restrictive and cannot perform configuration commands. Only users with admin level privilege can access the administrative page through a browser. All other accesses are rejected.

Using the Web Interface

The web interface switch management system provides a Graphical User Interface (GUI) for users to display Fabric topology, general switch information, port traffic statistics and throughput performance. The GUI enables switch administrators to configure the switch and its ports.

Controlling the Web Interface

To control the Web interface, perform the following:

❶ Position the cursor over an object (such as a port or the thermometer) and click.

❷ An informational screen displays. In some instances, you can change the definitions by completing text fields. See the "Administrative Interface Page" section in Chapter 3 for more information).

Fabric View Page

The Fabric View page is the first Web page that displays in the Web interface. This is a global page and shows all switches present that comprise the Fabric. See the "Fabric View Page" section in Chapter 3 for more information.

Note: Any switch in the Fabric can show the overall Fabric view. It is not critical which switch is accessed initially.

The Fabric View page can show a maximum of 16 switches and uses switch names to connect to individual switches. This means you give each switch a unique name and this name should match the correct IP address by the name resolution protocol in use by the Web client (NIS, DNS, etc.). See Table 3-5 in Chapter 3 on how to use the *switchName* command)

If a switch name is not recognized by the name resolution protocol, it may be accessed by typing in its IP address from the Fabric View page. (Double click on the switch image while pressing down the Shift key to open a dialog box and enter the IP address or host name.)

Fabric Topology View Page

The Fabric Topology View page shows the physical configuration including active domains and paths, and routing information. See the "Fabric Topology View Page" section in Chapter 3 for more information.

General Switch View Page

The General Switch View page shows a graphic representation of the switch's front panel. Normal long term monitoring is conducted from this page. It provides you with a real-time view of each switch's overall health and status in the Fabric. See the "General Switch View Page" section Chapter 3 for more information.

Note: If a switch has a problem, a pop-up message displays explaining what problem was detected.

Port Detail View Page

The Port Detail View page provides statistics for each port. The page features 16 cascaded folders, one for each port. Each folder has a tab on the top to show the port number and a status light to tell the port state. See the "Port Detail View Page" section in Chapter 3 for more information.

Performance View Page

The Performance View page displays port and switch throughput in bytes per second. Each port is numbered and throughput for the entire switch displays under the individual port readings. See the "Performance View Page" section in Chapter 3 for more information.

Administrative Interface Page

The Administrative Functions page is used to enable (or disable) the switch or ports. You can change switch name, date/time, IP addresses, user name, passwords, download flash, and reboot switch. Any changes made through this page may fundamentally change the switch/port status and its role in the fabric. See the "Administrative Interface Page" section in Chapter 3 for more information.

Note: Only users with admin privilege can access this page.

Telnet Interface Page

The Telnet Interface Page allows you to launch a Telnet session directly from your Web browser. See the *StorageNet Fibre Channel Switch 4000 Installation and Reference Guide* for detailed information and supported Telnet commands. To launch a Telnet session, click the *Telnet* button on the General Switch View page.

Notes: Only users with admin or user privilege can access this page. It is not in the help menu.

Users with user (through Telnet) or admin level privilege can access these pages. The user level is more restrictive and cannot perform configuration commands. You can access the administrative page through a browser from the admin level. All other accesses are rejected.

HotJava browsers do not support Telnet commands.

Chapter 3 Using WEB TOOLS

Introduction

This chapter contains general information and examples on managing and monitoring the switch through the WEB TOOLS. The chapter includes information on each of five pages, two password protected pages, status information, and control functions available.

Fabric View Page

Figure 3-1 shows the Fabric View page which displays up to 16 switches in a grid. The lines between switches represent the Fabric recognizes a switch. This does not indicate connectivity or how the switch is connected to the Fabric.

To provide additional switch information, double click on a switch to display the General Switch View page. See the "General Switch View Page" section for more information.

Select the *Fabric Topology* button to display a Fabric Topology View page. See the "Fabric Topology View Page" section for more information.

Figure 3-1 Fabric View Page

Shows Switch Connectivity within Fabric

Fabric Topology View Page

Figure 3-2 and Figure 3-3 show the Fabric Topology View page. The Fabric topology shown is viewed from the host domain (or host switch) which is initially requested from the web browser. This page is broken up into two figures and shows the physical configuration including active domains, paths and routing information. For example, this page shows the hop count. Hop count is the number of switches that handle a data frame from origination to the destination.

The first item that appears in this page is a list of active domains (or switches) in the Fabric. Following the active domain list is a table unfolding the views of active paths from the host domain to all remote domains in the Fabric. This table is grouped by domains. The worldwide name and IP address are included under each domain. Each active path table displays host switch output port number, host switch input port number, the hop count and metrics (costs) from the host domain to the remote domain and the path flag.

Figure 3-2 Fabric Topology View Page Part One

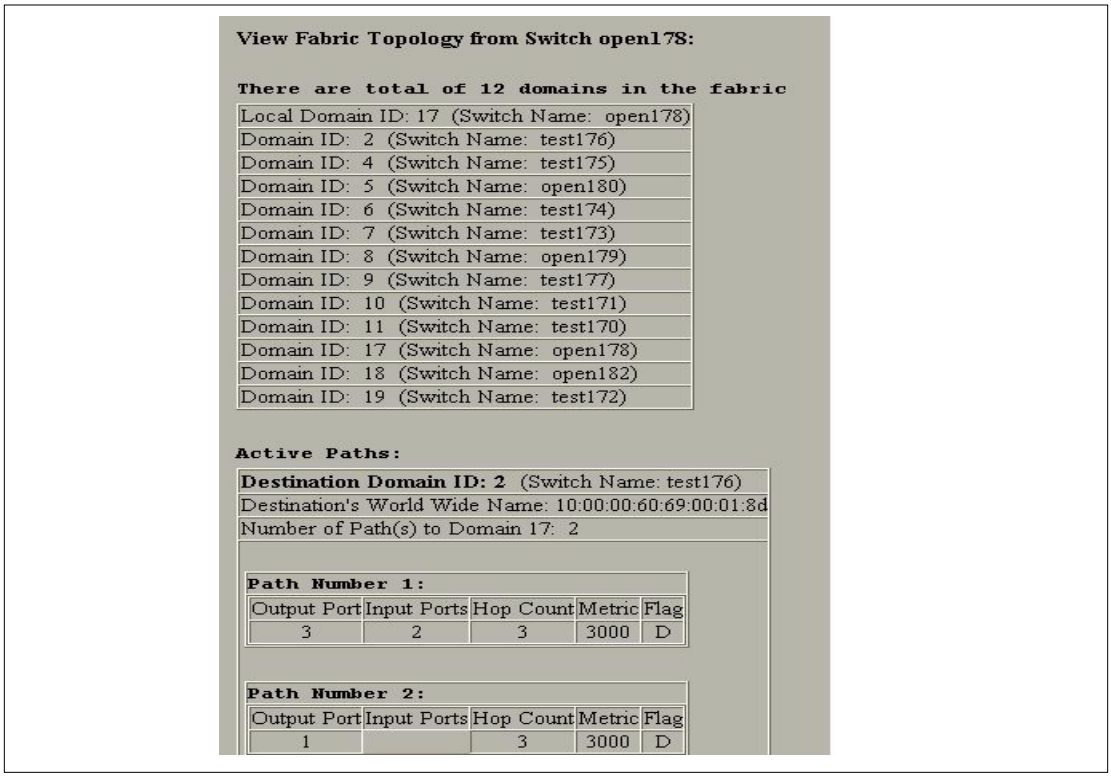

View Fabric Topology from Switch open178:
There are total of 12 domains in the fabric
Local Domain ID: 17 (Switch Name: open178)
Domain ID: 2 (Switch Name: test176)
Domain ID: 4 (Switch Name: test175)
Domain ID: 5 (Switch Name: open180)
Domain ID: 6 (Switch Name: test174)
Domain ID: 7 (Switch Name: test173)
Domain ID: 8 (Switch Name: open179)
Domain ID: 9 (Switch Name: test177)
Domain ID: 10 (Switch Name: test171)
Domain ID: 11 (Switch Name: test170)
Domain ID: 17 (Switch Name: open178)
Domain ID: 18 (Switch Name: open182)
Domain ID: 19 (Switch Name: test172)
Active Paths:
Destination Domain ID: 2 (Switch Name: test176)
Destination's World Wide Name: 10:00:00:60:69:00:01:8d
Number of Path(s) to Domain 17: 2
Path Number 1:
Output Port Input Ports Hop Count Metric Flag
3 2 3 3000 D
Path Number 2:
Output Port Input Ports Hop Count Metric Flag
1 3 3000 D

Figure 3-3 Fabric Topology View Page Part Two

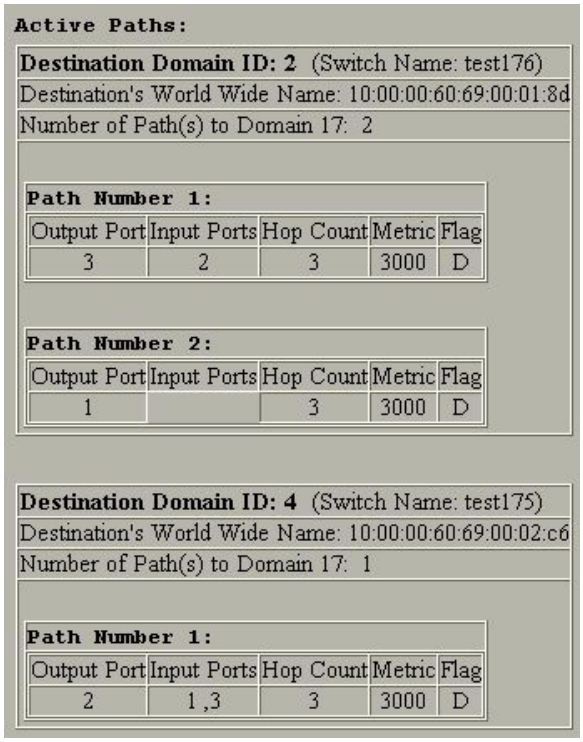

Active Paths:
Destination Domain ID: 2 (Switch Name: test176)
Destination's World Wide Name: 10:00:00:60:69:00:01:8d
Number of Path(s) to Domain 17: 2
Path Number 1:
Output Port Input Ports Hop Count Metric Flag
3 2 3 3000 D
Path Number 2:
Output Port Input Ports Hop Count Metric Flag
1 3 3000 D
Destination Domain ID: 4 (Switch Name: test175)
Destination's World Wide Name: 10:00:00:60:69:00:02:c6
Number of Path(s) to Domain 17: 1
Path Number 1:
Output Port Input Ports Hop Count Metric Flag
2 1 ,3 3 3000 D

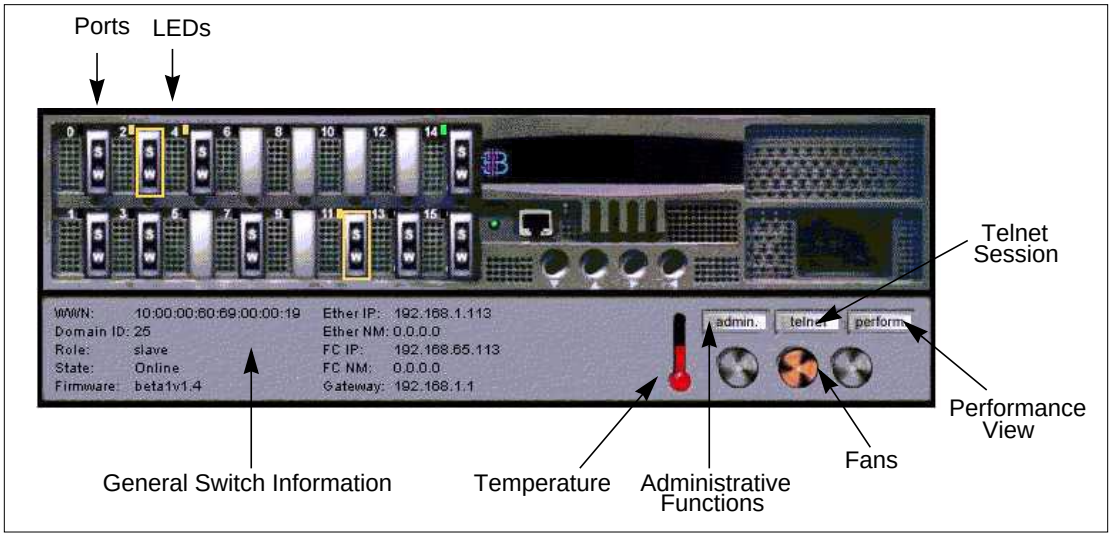
Table 3-1 Fabric Topology Fields

Field	Description
List of Active Domains in the Fabric	Displays the number of active domains in the Fabric including switch names and switch domain ID.
List of Active Paths by Domain	Displays the domain ID associated with the switch name, WWN, and total number of paths by domain. Each path is displayed including: • Output Ports • Input Ports • Metric • Flag

General Switch View Page

Figure 3-4 shows the General Switch View page. This page displays when you query the switch from the Fabric View page. This page displays the ports, LEDs, general switch information, temperature, fans and buttons for administration functions, Telnet session, and performance view.

Figure 3-4 General Switch View Page



The *admin* button links to the system administration pages where you can disable or enable a port depending on the appropriate authentication. See the "Administrative Interface Page" section and Table 3-5 for more information. The *performance* button links to the Performance View page. See the "Performance View Page" section for more information. The *Telnet* button launches a Telnet session. See the "Telnet Interface Page" section in Chapter 2 for more information.

Under normal conditions, the graphic displays animated thermometers and spinning fans. The color and blinking speed of the port LEDs are updated every 1 to 2.5 seconds depending on the operating system and browser used. Warning messages automatically display in a pop-up window if problems occur. For example, if the temperature exceeds the maximum value, a fan stops rotating or a port state becomes problematic. Push buttons located on the bottom of the warning message popup window are connected to a separate browser providing basic troubleshooting guides.

Note: The thermometer displays the highest temperature from the last data sample. Click the thermometer to display the temperature readings from all five switch sensors.

Table 3-2 gives a brief description of the fields in the General Switch View page.

Table 3-2 General Information Fields

Field	Description
WWN	The switch's WWN is a unique numeric identifier for each switch and it is assigned by the manufacturer. A numbering scheme administrated globally assures that this WWN is unique to this switch.
Domain ID	The domain ID 0 to 31. This number uniquely identifies the switch in a Fabric.
State	The switch state. Possible values include Online, Offline, Testing and Faulty.

Table 3-2 General Information Fields (Continued)

Field	Description
Role	The three possibilities for role including: • Principal–the principal switch as defined in FC-SW • Subordinate–this switch is enabled and not the principal switch • Disabled–the switch is disabled.
Firmware	The firmware version.
EtherIP	The default Ethernet IP address is a temporary number derived from the switch's WWN. You must enter a valid IP address
Ether NM	The default Ethernet subnetmask value is none.
FC IP	The default Fibre Channel IP address is a temporary number derived from the switch's WWN. You must enter a valid IP address.
FC NM	The default Fibre Channel subnetmask is none.
Gateway	The default gateway address is 0.0.0.0. You must enter a valid gateway address, if required.

The upper half of the graphic shows port and LED status. The lower half of the graphic contains general switch information. Selecting the label on each text field displays a pop-up dialog box that explains the field.

The blinking green lights on the graphic indicate problem status. Solid black indicates no device is attached. Each port module is a clickable hyperlink which takes you to a third page, the Port Detail View page. See Table 3-3 and the "Port Detail View Page" section for more information. Each port includes the port number, a status LED and port detail information.

If a port card is not installed, a solid black rectangle displays and the port status displays as "No_Card." If the interface is installed but no GBIC is present, a silver rectangle displays and the port status displays as "No_Module."

If the port contains a GBIC, one of the following displays:

- For copper GBICs, a graphic representation of a copper GBIC with the letters "CU"
- For short wave fiber GBICs, a graphic representation of a GBIC with the letters "S" and "W"
- For long wave fiber GBICs, a graphic representation of a GBIC with the letters "L" and "W"
- If the port is on an arbitrated loop, the letters "F/L" display in an oval between the ports associated with the card.
- If the port failed, the port is outlined in amber to indicate a failure.

The color and flash speed of each LED, as described in Table 3-3, indicates port status.

Table 3-3 Port LED Status Indicators

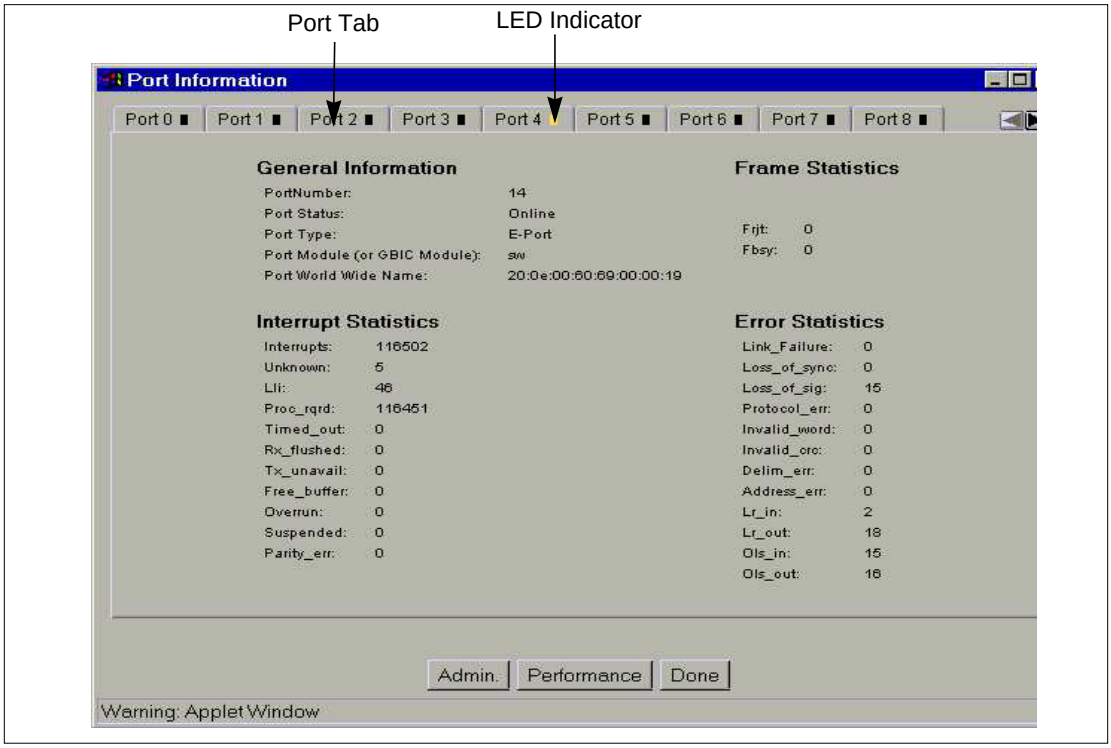
Port LEDs	Definition
No light showing	No light (no module, no cable) for media interface LEDs. Power not applied for power indicator LED.
Steady yellow	Receiving light, but not yet online. If the port transitions to this state while being monitored, a dialog box displays recommending a course of action.
Slow yellow	Disabled (result of diagnostics or portDisable command). Flashes every two seconds. A dialog box displays recommending a course of action.
Fast yellow	Error, fault with port. Flashes every 1/2 second. A dialog box displays recommending a course of action.
Steady green	Online (connected with device over cable).
Slow green	Online, but segmented (loopback cable or incompatible switch). Flashes every two seconds.
Fast green	Internal loopback (diagnostic). Flashes every 1/2 second.
Flickering green	Online and frames flowing through port.

Port Detail View Page

Figure 3-5 shows the Port Detail View page which features 16 cascaded folders. Each folder has a tab on the top to show the port number. It also has a status light to tell the port state (disabled or enabled with the same light as described in Table 3-3).

Port information is updated once per second. However, the time interval maybe as long as 2.5 seconds depending on the browser used. A system administrator gains the knowledge of each port state by glancing at those 16 or 8 tabs. The default top folder displayed on this page is for the port number checked from the General Switch View page. Clicking a tab brings the corresponding port folder to the front.

Figure 3-5 Port Detail View Page



At the bottom of the Port Detail View page is a push button linked to the Administrative Interface Page. This is where port you can enable or disable a port. See the "Administrative Interface Page" section for more information.

A push button linked to the Performance View page is also located on the bottom of the page. This is where port and switch throughput data is plotted. See the "Performance View Page" section for more information.

Use the *Done* push button to exit from the page.

Each port folder contains general port status information such as the port number, port type (E-Port, G-Port), port's WWN name and detailed information (such as the number of interrupts, number of link failures, number of parity errors, number of time outs and the size of free buffer).

The LED located in the upper right corner of each tab resembles the port LED in the switch front panel. See the "General Switch View Page" section for more information.

Table 3-4 gives a brief description of the fields in the Port Detail View page.

Table 3-4 Port Detail View Page Fields

Field	Description
Port Number	The port number.
Port Status	The port state follows the GBIC type. The possible port states include: • No_Card – no card present in this switch slot • No_Module – no GBIC module in this port • No_Light – the module is not receiving light • No_Sync – the module is receiving light but is out of sync • In_Sync – the module is receiving light and is in sync • Laser_Flt – the module is signaling a laser fault (defective GBIC) • Port_Flt – the port has been marked faulty (defective GBIC, cable, or device) • Diag_Flt – the port failed diagnostics (defective G_Port or FL_Port card or motherboard) • Online – the port is up and running • Lock_Ref – the port locking to the reference signal
Port Type	The port type (E_Port, G_Port or FL_Port).
Port Module (or GBIC Module)	The GBIC type follows the port number. The four GBIC types include: • -- – no GBIC present • sw – shortwave GBIC • lw – longwave GBIC • cu – copper GBIC
Port World Wide Name	The World Wide Name for this port.
Interrupts	Total number of interrupts.
Unknown	Number of unknown interrupts.
Lli	Number of low level interface (LLI) interrupts.
Proc_rqrd	Number of interrupts with processing (CPU) required.
Timed_out	Number of timed out interrupts.
Rx_flushed	Number of flushed transmissions.
Tx_unavail	Number of interrupted transmissions.
Free_buffer	Number of buffer interrupts.
Overrun	Number of buffer overruns.
Suspended	Number of suspended interrupts.
Parity_err	Number of parity errors.

Table 3-4 Port Detail View Page Fields (Continued)

Field	Description
Frjt	Number of Frame rejected.
Fbsy	Number of frames busy.
Link_Failure	Number of link failure.
Loss_of_sync	Loss of synchronization.
Protocol_err	Protocol error.
Invalid_word	Invalid word (encoding errors inside of frames).
Invalid_crc	Invalid CRC in a frame.
Delim_err	Delimeter error (order set)
Address_err	Address id error (S_ID D_ID)
Lr_in	Link reset in (primitive sequence). Does not apply to FL_Port.
Lr_out	Link reset out (primitive sequence). Does not apply to FL_Port.
Ols_in	Offline resent in (primitive sequence). Does not apply to FL_Port.
Ols_out	Offline resent in (primitive sequence). Does not apply to FL_Port.

Performance View Page

Figure 3-6 shows the Performance View page. This page displays port and switch throughput (in bytes per second). The first 16 graphs show the port throughput for port number 0 through 15. Throughput for the entire switch displays in the long rectangular graph at the bottom.

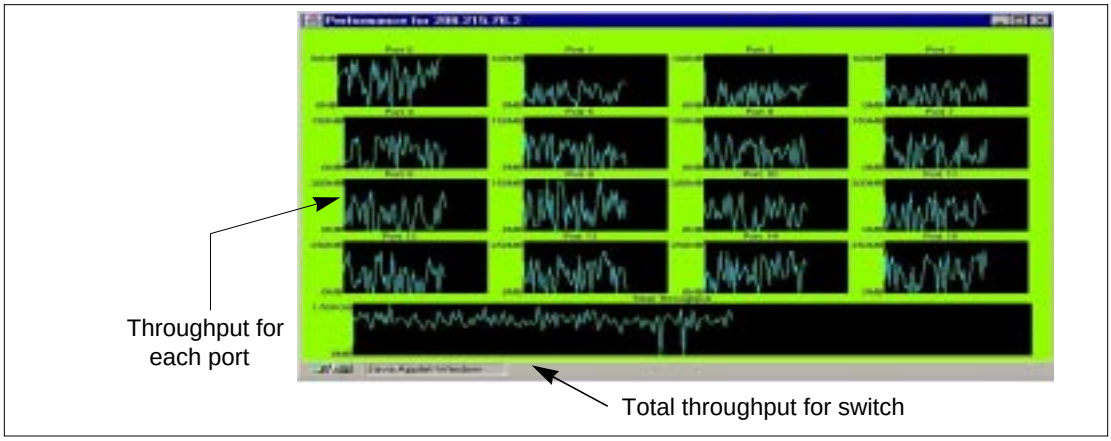
Notes: Horizontal axis represents time elapsed. The port throughput graphs hold up to 60 seconds of performance data. The switch throughput graph at the bottom holds up to four minutes of performance data.

Vertical axis in each graph shows throughput (in bytes per second). It is automatically scaled depending on the switch activity. The display is updated roughly once per second.

The total throughput value is the throughput sum for all ports. The throughput number represents the number of bytes received plus the number of bytes transmitted each second.

Note: Because the switch also transmits all data it receives, the total throughput for the switch could, alternately, be stated as one-half (1/2) of the throughput sum of all ports.

Figure 3-6 Performance View Page



Administrative Interface Page

Figure 3-7 shows the Administration Interface page. Any changes made through this page may fundamentally change the switch/port status and its role in the fabric. Check and input boxes are provided for you to type in the changes. You can apply these changes using the *Submit* buttons. You can enable (or disable) the switch or ports (8 or 16). You can also change switch name, IP addresses, user name, passwords, download flash, and reboot switch using this page.

Note: Only users with admin privilege can access this page.

Figure 3-7 System Administration Page

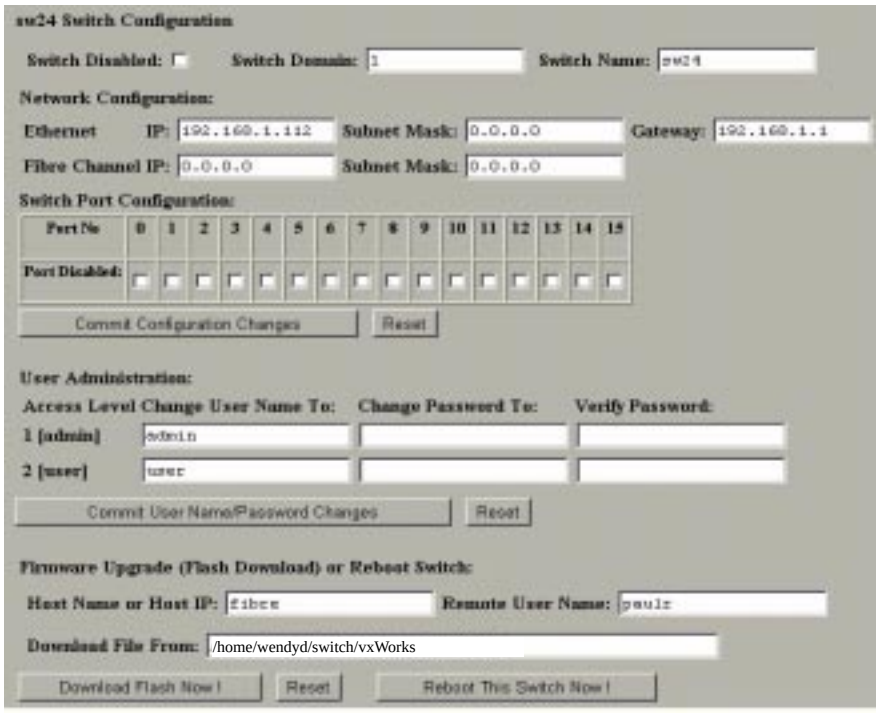


Table 3-5 gives a brief description of the fields in the Administrative Interface page.

Table 3-5 System Administration Fields

Category	Field	Description
Switch Administration	Switch Disabled	If the box is checked, the switch is disabled. It may need to be enabled after firmware upgrades, maintenance, and diagnostic tests. To enable the switch, click the check box to remove the check. Select the *Commit Configuration Changes* button.
	Switch Domain	The switch domain text box displays or sets the switch domain.To update the switch domain, enter the new domain and select the **Commit Configuration Changes** button.
	Switch Name	The switchName text box displays *or* sets the switch's name. To update the switch name, enter the new name. Select the *Commit Configuration Changes* button.
Network Administration	Ethernet IP	The IP address for the Ethernet connection to the switch. The default IP address is a temporary number derived from the switch's WWN. Refer to the network administrator for the appropriate IP address.
	Ethernet Subnetmask	The default subnetmask value is none. Refer to the network administrator for the appropriate subnet mask value to enter here.
	Gateway	The gateway address. Refer to the network administrator for the appropriate gateway address value to enter here.
	Fibre Channel IP	The Fibre Channel IP address. The default IP address is a temporary number derived from the switch's WWN. Refer to the network administrator for the appropriate IP address.
	Fibre Channel Subnetmask	The default subnetmask value is none. Refer to the network administrator for the appropriate subnet mask value to enter here.
Switch Port Configuration	Port Number	The port number on a particular switch.
	Port Disabled	If the box is checked, the port is disabled. It may need to be enabled after maintenance and diagnostic tests. To enable the port, click the check box. Select the *Commit Configuration Changes* button.
Commit Configuration Changes		Applies administrative changes.
Switch User Administration	Change User Name	Only users with admin level can change user name for admin and user.
	Change Password	To change passwords, enter new password here.
	Verify Password	For new passwords, reenter the password here for verification.

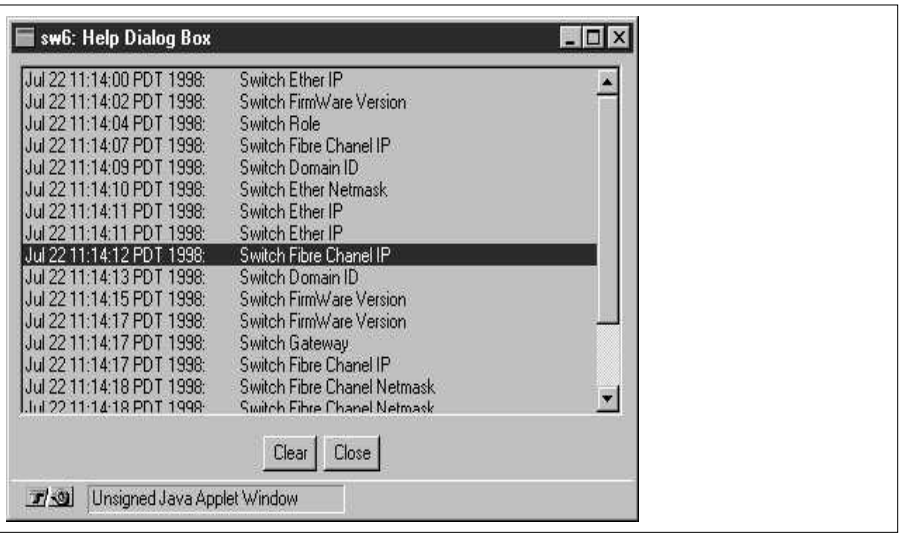
Table 3-5 System Administration Fields

Category	Field	Description
Commit Username and Password Changes		Applies administrative changes.
Reset		Resets the display to previous defaults.
Flash Download	Host Name or Host IP	The host name or Host IP address
	Remote User Name	The remote user name
	Download File From	The absolute directory path from the source host where the binary firmware file resides. **Note:** You must use UNIX style forward slashes (/) when downloading firmware from a Windows NT system.
	Download Flash Now	Downloads firmware into flash memory.
	Reboot This Switch Now	Press this button to immediately exit all current processes and states.

Popup Help Dialog Box

The pop-up Help Dialog Box displays all glossary help and warning messages, as shown in Figure 3-8. This pop-up dialog box can contain up to 100 entries, each with a time stamp. When over 100 entries are recorded, the top item is deleted sequentially in order to display a new message. A single click on each item brings up a separate browser displaying glossary help or troubleshooting information. The history is maintained when you reload or refresh the browser. The history is cleared when you exit the browser.

Figure 3-8 Popup Help Dialog Box


sw6: Help Dialog Box
Jul 22 11:14:00 PDT 1998: Switch Ether IP
Jul 22 11:14:02 PDT 1998: Switch FirmWare Version
Jul 22 11:14:04 PDT 1998: Switch Role
Jul 22 11:14:07 PDT 1998: Switch Fibre Chanel IP
Jul 22 11:14:09 PDT 1998: Switch Domain ID
Jul 22 11:14:10 PDT 1998: Switch Ether Netmask
Jul 22 11:14:11 PDT 1998: Switch Ether IP
Jul 22 11:14:11 PDT 1998: Switch Ether IP
Jul 22 11:14:12 PDT 1998: Switch Fibre Chanel IP
Jul 22 11:14:13 PDT 1998: Switch Domain ID
Jul 22 11:14:15 PDT 1998: Switch FirmWare Version
Jul 22 11:14:17 PDT 1998: Switch FirmWare Version
Jul 22 11:14:17 PDT 1998: Switch Gateway
Jul 22 11:14:17 PDT 1998: Switch Fibre Chanel IP
Jul 22 11:14:18 PDT 1998: Switch Fibre Chanel Netmask
Clear
Close
Unsigned Java Applet Window

Note: When you reload or refresh the browser, it closes all pop-up windows (Help Dialog Box, Performance window and Port Detail window) without leaving orphan windows for the operating system to handle.

Appendix A Glossary

Alias Server: A Fabric software facility that supports multicast group management.

Arbitrated Loop: The FC Arbitrated Loop (FC-AL) is a standard defined on top of the FC-PH standard. It defines the arbitration on a loop where several FC nodes share a common medium.

Community (SNMP): An SNMP community is a relationship between an SNMP agent and a set of SNMP managers that defines authentication, access control, and proxy characteristics.

Credit: Credit, applied to a switch, is a numeric value that represents the maximum number of receive buffers provided by an F_Port or FL_Port to its attached N_Port or NL_Port respectively such that the N_Port or NL_Port may transmit frames without over-running the F_Port or NL_Port.

Class 2: In Class-2 service, the Fabric and destination N_Port provide connectionless service with notification of delivery or nondelivery between the two N_Ports.

Class 3: Class-3 service provides a connectionless service without notification of delivery between N_Ports. The transmission and routing of Class-3 frames is the same as for Class-2 frames.

Domain_ID: The domain number uniquely identifies the switch in a Fabric. This switch domain ID is normally automatically assigned by the switch and may be any value between 0 and 31. This number may also be assigned manually.

E_Port: A port used as an interswitch expansion port to connect to the E_Port of another switch to build a larger switch Fabric.

Error Detect Time Out Value (E_D_TOV): E_D_TOV defines the time the switch waits for an expected response before declaring an error condition. The E_D_TOV is adjustable in 1ms increments from two seconds up to ten seconds.

Fabric: The name applied to a network resulting from the interconnection of switches and devices comprised of high-speed fiber connections. A Fabric is an active, intelligent, nonshared interconnect scheme for nodes.

FL_Port: The Fabric access port used to connect NL_Ports to the switch in a loop configuration.

F_Port: The Fabric access port used to connect an N_Port.

FSPF: Fibre-Channel shortest path first.

G_Port: A port that has not assumed a specific function. A G_Port is a generic switch port that can operate either as an E_Port or an F_Port. A port is defined as a G_Port, for example, when it is not connected or has not yet assumed a specific function in the Fabric.

Interswitch Link (ISL): ISL is a fiber link between two switches

Loop: A configuration of devices (for example, JBODs) connected to the Fabric through an FL_Port interface card.

Multicast: Multicast is used when multiple copies of data are to be sent to designated multiple destinations.

N_Port: An equipment port connected to the Fabric.

NL_Port: An equipment port connected to the Fabric in a loop configuration via an FL_Port.

Power on self test (POST): A series of self tests which run each time the unit is booted or reset.

Resource Allocation Time Out Value (R_A_TOV): R_A_TOV is used to time out operations that depend on the maximum possible time that a frame could be delayed in a Fabric and still be delivered. The value of R_A_TOV is adjustable in 1-microsecond increments over a range from 10 to 120 seconds.

Isolated E_Port: ISL is online but not operational between switches because of overlapping domain ID or nonidentical parameters such as E_O_TOVs.

Simple Network Management Protocol (SNMP): SNMP is a TCP/IP protocol that generally uses the User Datagram Protocol (UDP) to exchange messages between a management information base and a management client residing on a network. Since SNMP does not rely on the underlying communication protocols, it can be made available over other protocols, such as UDP/IP.

SNMPv1: The original standard for SNMP is now referred to as SNMPv1.

Trap (SNMP): A mechanism for SNMP agents to notify the SNMP management station of significant events.

Unicast: Unicast routing provides one or more optimal path(s) between any of two switches that make up the Fabric. This is for a single copy of the data to be sent to designated destinations.

World Wide Name (WWN): A WWN uniquely identifies a switch on local and global networks.

Appendix B Error Messages

Introduction

This appendix contains error message formats and possible errors. It includes the following:

- Fan error message
- Port Error Messages
- Thermometer Error Message

Fan Error Message

Fan has stopped spinning.

```
Please check the fans inside the switch box.
```

Port Error Messages

The GBIC was removed from this port (solid black LED).

```
Please check the switch front panel for GBICs.
```

Port is receiving no light (solid black LED).

```
There is no G_Port board or no GBIC module for this port.
Please check the switch front panel.
```

Port is receiving light, but not yet online (solid amber LED).

```
Cable is partially inserted in the port, or the device at the other end of the cable
is not functioning properly.
Please check the switch front panel or check the device on the other end of the cable.
```

Port is disabled (slow flashing amber LED).

```
The port was disabled by an administrator manually via the front panel, or via one of
the management tools.
```

Port has a fault (fast flashing amber LED).

```
One or more faulty conditions have occurred.
Laser_Flt:   the module is signaling a laser fault (defective GBIC);
Port_Flt:    the port has been marked faulty (defective GBIC, cable or device)
Diag_Flt:    the port failed diagnostics (defective G_Port card or motherboard)
```

Port is OK (solid green LED).

```
The port is online and connected to a device over the cable.
```

Port is segmented (slow flashing green LED).

```
Port is online but segmented.
Please check for loopback cable or incompatible switch.
```

Port has an internal loopback (fast flashing green LED).

```
The port is configured as a loopback port by diagnostics to verify the proper
functioning of the internal Fibre Channel port logic and paths between the interface
and the central memory. portEnable will put the port back online again.
```

Port is sending data (flickering green LED).

```
The port is online and transmitting/receiving frames.
```

Thermometer Error Message

Temperature out of range.

```
One or more temperature sensors have exceeded the minimum or maximum allowed
temperature reading (Minimum temperature is zero degrees Centigrade, maximum is 75o
degrees Centigrade).
Please check the temperature sensors inside the switch box.
```

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